

**Society for Ambulatory Anesthesia Consensus Statement on Perioperative Blood Glucose Management in Diabetic Patients Undergoing Ambulatory Surgery**

At the 2010 Society For Ambulatory Anesthesia (SAMBA) Annual Meeting in Baltimore, the SAMBA Board and SAMBA members approved the consensus statement on perioperative glycemic control in diabetic patients undergoing ambulatory surgery. The consensus panel included Girish P. Joshi, MD (Chair), Shireen Ahmad, MD, Frances Chung, MD, Tong J Gan, MD, Daniel T. Goulson, M.D., Douglas Merrill, MD, and Rebecca S. Twersky, MD. None of the members had any conflicts of interests. No external funding was provided from any source and no funding was required from SAMBA.

A systematic review of the literature was conducted according the protocol recommended by the Cochrane Collaboration. The consensus panel used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system for developing the consensus statement. It was revealed that the literature on perioperative glycemic control in patients undergoing ambulatory surgery is sparse and of limited quality. In absence of high quality evidence, recommendations were based on general principles of blood glucose control in diabetics, drug pharmacology, data from inpatient surgical population and clinical judgment. The consensus panel considered specific clinical questions.

**1. Preoperative information specifically related to glycemic control should be obtained in the diabetic patient?**

- Level of glycemic control (as assessed by blood glucose levels and HbA1c, if available).
- Type and dose of antidiabetic therapy (i.e., oral antidiabetics and/or insulin).
- Frequency and manifestations of hypoglycemia.
- Blood glucose level at which hypoglycemic symptoms occur.
- Hospital admissions due to glycemic control issues.
- Ability of the patient to reliably test their blood glucose levels.

**2. How do we manage preoperative oral antidiabetic and non-insulin injectable therapy?**

- Hypoglycemia does not occur in patients on oral antidiabetics except rarely with sulfonylureas, meglitinides, and non-insulin injectables.
- It may not be necessary to discontinue these drugs prior to the day of surgery; however, they should not be taken on the day of surgery.
- Lactic acidosis rarely occurs with metformin, except in patients with renal dysfunction and with the use of intravenous contrast, in which case it may be discontinued 24-48 h prior to surgery.

**3. How do we manage preoperative insulin therapy?**

| Insulin Regimen                | Day Before Surgery | Day of Surgery          | Comments  |
|--------------------------------|--------------------|-------------------------|---|
| Insulin pump                   | No change          | No change               | - Use "sick day" or "sleep" basal rates   |
| Long-acting, peakless insulins | No change          | 75-100% of morning dose | - Reduce nighttime dose if history of nocturnal or morning hypoglycemia<br>- On the day of surgery, the morning |

|                                 |  |   |   |
|---------------------------------|--|---|---|
|                                 |  |   | dose of basal insulin may be administered on arrival to the ambulatory surgery facility   |
| Intermediate-acting insulins    | - No change in the daytime dose<br>- 75% of dose if taken in the evening | 50-75% of morning dose                                  | - See the comments for long-acting insulins   |
| Fixed combination insulins      | No change  | 50-75% of morning dose of intermediate-acting component | - Lispro-protamine only available in combination, therefore use NPH instead, on day of surgery<br>- See the comments for long-acting insulins |
| Short- and Rapid-acting insulin | No change  | Hold the dose   |   |
| Non-insulin injectables         | No change  | Hold the dose   |   |

**4. Is there a preoperative blood glucose level above which one should postpone elective surgery?**

- Surgery should be postponed in patients with significant complications of hyperglycemia such as severe dehydration, ketoacidosis, and hyperosmolar non-ketotic states.
- It may be acceptable to proceed with surgery in patients with preoperative hyperglycemia, but with adequate long-term glycemic control.
- In chronically poorly controlled diabetics, the decision to proceed with ambulatory surgery should be made in conjunction with the surgeon while taking into consideration the presence of other comorbidities and the potential risks of surgical complications.

**5. What is the optimal intraoperative period blood glucose level?**

- In patients with well-controlled diabetes, intraoperative blood glucose levels should be maintained less than 180 mg/dl (10.0 mmol/l).
- However, chronically elevated blood glucose levels should not be decreased acutely in the perioperative period.

**6. How do we maintain optimal blood glucose levels?**

- Subcutaneous administration of rapid-acting insulin analogs is the preferred method for achieving and maintaining target glucose levels.
- There is not enough evidence to recommend a dosing schedule to optimize the blood glucose levels.
- The "rule of 1800 or 1500", which provides the expected decrease in blood glucose with each unit of insulin may be used. Thus, if the patients daily insulin requirement is uses 60 units, one unit of insulin would reduce in blood glucose level by 25-30 mg (i.e., 1500/60 or 1800/60).

**7. What are the other considerations specific to glycemic control in diabetic outpatients?**

- Patients should be asked to bring all their insulins with them to the facility.
- Patients should travel with a suitable treatment for hypoglycemia that might occur in transit.
- Aggressive nausea and vomiting prophylaxis is recommended.
- Dexamethasone 4 mg can be used, but should be followed with appropriate monitoring of blood glucose levels.

**8. What is the optimal perioperative blood glucose monitoring?**

- Blood glucose levels should be checked on the patient's arrival to the facility as well as prior to discharge home.
- Intraoperative blood glucose monitoring can be performed every 1-2 hour, depending upon the duration of procedure and type of insulin used. For example, intraoperative monitoring may not be necessary for procedures less than 2 hours.
- More frequent measurements may be required for patients who have received insulin and those with lower blood glucose levels.

**9. How should we identify and manage perioperative hypoglycemia?**

- Blood glucose level of less than 70 mg/dl is generally considered as an alert value for hypoglycemia.
- In the symptomatic patient, the preferred method for treatment of hypoglycemia is consumption of 15-20 gm of glucose, which is repeated until blood glucose rises and symptoms resolve.
- Overzealous glucose administration should be avoided as hyperglycemia can have significant detrimental.

**10. What are the discharge considerations for diabetic outpatients?**

- Patients should be observed in an ambulatory facility until the possibility of hypoglycemia from perioperatively-administered insulin is ruled out.

**11. What advice should we give to patients for glucose control after discharge home?**

- Patients should be instructed to check blood glucose levels frequently while fasting.
- Patients should carry hypoglycemia treatments while traveling to and from the surgical facility.
- Patients should be advised that transition to daily preoperative antidiabetic regimens should be delayed if normal caloric intake is delayed.